



Low Concentration Organic Analytical Service for Superfund (Water Matrix) (OLC03.2)

Office of Emergency and Remedial Response
Analytical Operations/Data Quality Center (5204G)

Quick Reference Fact Sheet

Under the legislative authority granted to the U.S. Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), EPA develops standardized analytical methods for the measurement of various pollutants in environmental samples from known or suspected hazardous waste sites. Among the pollutants that are of concern to the EPA at such sites are a series of volatile, semivolatile, and pesticide/Aroclor (pesticide/PCB) compounds that are analyzed using Gas Chromatography coupled with Mass Spectrometry (GC/MS) and Gas Chromatography with an Electron Capture Detector (GC/ECD). The Analytical Operations/Data Quality Center (AOC) of the Office of Emergency and Remedial Response (OERR) offers an analytical service that provides data from the analysis of water samples for low concentration organic compounds for use in the Superfund decision-making process. Through a series of standardized procedures and a strict chain-of-custody, the low concentration organic analytical service produces data of known and documented quality. This service is available through the Superfund Contract Laboratory Program (CLP).

DESCRIPTION OF SERVICES

The low concentration organic analytical service provides a contractual framework for laboratories to apply EPA/CLP analytical methods for the isolation, detection, and quantitative measurement of 50 volatile, 65 semivolatile, and 28 pesticide/Aroclor (pesticide/PCB) target compounds in water samples. The analytical service provides the methods to be used and the specific contractual requirements, by which EPA evaluates the data. The options for data turnaround time for this contract are 7, 14, or 21 days after laboratory receipt of the last sample in the Sample Delivery Group (SDG). This service uses Gas Chromatography/Mass Spectrometry (GC/MS) and Gas Chromatography with Electron Capture Detector (GC/ECD) techniques to analyze the target compounds.

DATA USES

This analytical service provides data that EPA uses for a variety of purposes such as: determining the nature and extent of contamination at a hazardous waste site; assessing priorities for response based on risks to human health and the environment; determining appropriate cleanup actions; and determining when remedial actions are complete. The data may be used at all stages in the investigation of hazardous waste sites including: site inspections; Hazard Ranking

System (HRS) scoring; remedial investigation/feasibility studies; remedial design; treatability studies; and removal actions. In addition, this service provides data that are available for use in Superfund enforcement/litigation activities.

TARGET COMPOUNDS

The compounds and quantitation limits for which this service is applicable are listed in **Table 1**. The lowest reportable quantitation limits are 0.50 µg/L for the volatile compounds, 5.0 µg/L for the semivolatile compounds, and 0.01 µg/L for the pesticide/Aroclor compounds. The list of target compounds for this service was originally derived from the EPA Priority Pollutant List of 129 compounds. In the years since the inception of the CLP, compounds have been added to and deleted from the Target Compound List (TCL), based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program.

METHODS AND INSTRUMENTATION

For volatiles, 25 mL of sample is added to a purge-and-trap device. A solution of 14 Deuterated Monitoring Compounds (DMCs) and a solution of internal standards are added to the sample which is then purged with an inert gas at room temperature.

DATA DELIVERABLES

Data deliverables for this service include hardcopy data reporting forms, supporting raw data, and electronic data on diskette or other means specified by EPA. The laboratory must submit data to EPA within 7, 14, or 21 days after laboratory receipt of the last sample in the SDG. EPA then checks the data for compliance with contract requirements. A report of instances of noncompliance is distributed to the laboratory and the Region within 7 days from the receipt of the data. The laboratory has 7 days from receipt of the report to reconcile defective data and resubmit the data to EPA. EPA then screens the data and sends a final data assessment report to the laboratory and the Region.

QUALITY ASSURANCE

The Quality Assurance (QA) process consists of management review and oversight at the planning, implementation, and completion stages of the environmental data collection activity. This process ensures that the data provided are of the quality required.

During the implementation of the data collection effort, QA activities ensure that the Quality Control (QC) system is functioning effectively and that the deficiencies uncovered by the QC system are corrected. After environmental data are collected, QA activities focus on assessing the quality of data to determine its

suitability to support enforcement or remedial decisions. Each contract laboratory prepares a Quality Assurance Plan (QAP) with the objective of providing sound analytical chemical measurements. The QAP must specify the policies, organization, objectives, and functional guidelines, as well as the QA/QC activities designed to achieve the data quality requirements for this analytical service.

QUALITY CONTROL

The QC process includes those activities required during analytical data collection to produce data of known and documented quality. The analytical data acquired from QC procedures are used to estimate and evaluate the analytical results and to determine the necessity for, or the effect of, corrective action procedures. The QC requirements for this analytical service are shown in **Table 3**.

PERFORMANCE MONITORING ACTIVITIES

Laboratory performance monitoring activities are provided primarily by AOC and the Regions to ensure that contract laboratories are producing data of the appropriate quality. EPA performs on-site laboratory audits, data package audits, and GC/MS tape audits, and evaluates laboratory performance through the use of blind PE samples.

Table 2. Methods and Instruments

Fraction	Preparation Method	Analytical Instrument
Volatiles	Purge-and-trap	GC/MS analysis
Semivolatiles	Continuous liquid-liquid extraction	GC/MS analysis
Pesticides/Aroclors (Pesticides/PCBs)	Continuous liquid-liquid or separatory funnel extraction	GC/ECD analysis

Table 3. Quality Control

QC Operation	Frequency
Deuterated Monitoring Compounds (DMCs) (volatiles and semivolatiles)	Added to each sample, standard, and blank.
Method Blanks (volatiles)	Analyzed at least every 12 hours.
Method Blanks [semivolatiles and pesticides/Aroclors (pesticides/PCBs)]	Prepared with each group of 20 field samples or less, or each time samples are extracted.
Instrument Blank (volatiles)	Analyzed after a sample that contains compounds at concentrations greater than the calibration range.
Instrument Blank [pesticides/Aroclors (pesticides/PCBs)]	Every 12 hours and preceding all groups of acceptable sample analysis.
Surrogates [pesticides/Aroclors (pesticides/PCBs)]	Added to each sample, standard, and blank.

Table 3. Quality Control (Continued)

QC Operation	Frequency
Storage Blank (volatiles)	Prepared and stored with each group of samples. Analyzed after all samples in the SDG have been analyzed.
Instrument Performance Check (volatiles and semivolatiles)	Prior to any analysis and every 12 hours.
GC Resolution Check [pesticides/Aroclors (pesticides/PCBs)]	Prior to initial calibration on each GC column used for analysis.
Initial Calibration	Upon initial set up of each instrument, after major instrument maintenance or modification, and each time continuing calibration fails to meet the acceptance criteria.
Continuing Calibration (volatiles and semivolatiles)	Every 12 hours for each instrument used for analysis.
Calibration Verification [pesticides/Aroclor (pesticides/PCBs)]	Beginning and end of each 12-hour data collection period.
Internal Standards (volatiles and semivolatiles)	Added to each sample, standard, and blank.
Laboratory Control Sample (LCS) [pesticides/Aroclor (pesticides/PCBs)]	Prepared and analyzed once per SDG.
Performance Evaluation (PE) Sample	Prepared and analyzed (if provided) with every 20 field samples in an SDG or for each SDG, whichever is most frequent.
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	Performed only when requested by Region. Performed with every 20 field samples in an SDG or for each SDG, whichever is most frequent.
Method Detection Limit (MDL)	Run before any samples analyzed under contract (annually thereafter) and after major instrument maintenance.
Sulfur Cleanup Blank [pesticides/Aroclor (pesticides/PCBs)]	Only when part of a set of samples extracted together requires sulfur removal.
Sample Cleanup by Florisil Cartridge	Performed on all sample extracts and method blank extracts.
Florisil Cartridge Performance Check [pesticides/Aroclor (pesticides/PCBs)]	Performed at least once on each lot of cartridges used for sample cleanup or every 6 months, whichever is most frequent.

For more information, or for suggestions to improve this analytical service, please contact:

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